REMARKS

The Applicants respectfully request further examination and reconsideration in view of the amendments above and the remarks below. Previously, claims 1-32 were pending in the application, of those claims 1-32 were rejected. Claims 1, 5, and 9 are amended above. Accordingly, claims 1-32 are still pending.

Claim Rejections Under 35 USC §103

Claims 1-32 stand rejected under 35 USC §103(a) as being unpatentable over "Modeling of Two-Phase Microchannel Heat Sinks for VLSI Chips" by Koo et al. ("Koo"), in view of at least Japanese Patent 01-256775 to Yamaguchi et al. ("Yamaguchi"). Several of the claims are rejected in further view of one or more of the following: U.S. Patent 6,182,742 to Takahashi et al. ("Takahashi"), U.S. Patent Publication US 2003/0121274 to Wightman ("Wightman"), U.S. Patent Publication US 2004/0089008 to Tilton et al. ("Tilton"), U.S. Patent 6,775,996 to Cowans ("Cowans"), U.S. Patent Publication 2004/0040695 to Chesser et al. ("Chesser"), U.S. Patent 6,023,934 to Gold ("Gold"), and "A Closed-Loop Electroosmotic Microchannel Cooling System for VLSI Circuits" by Jiang et al. ("Jiang"). The Applicants respectfully traverse the rejections within the Office Action and submit that the various combinations of references relied upon within the Office Action do not make obvious the currently amended claims, as further outlined below.

The primary reference combination relied upon to show obviousness of the claimed invention is that of Koo in view of Yamaguchi as applied to claim 1.

The above amendment to claim 1 specifically recites that the cooling system is sealed, and that the fluid and any gas generated from boiling remains sealed within the cooling system. Within the Office Action, it is stated (FIG. references omitted),

> Koo discloses applicant's basic inventive concept, a method of cooling a heat-generating device using a pump to cause a fluid to flow in a heat exchanger and having a heat rejector, substantially as claimed.

The Office Action further contends,

> Koo does not disclose adjusting the refrigerant's pressure and details related thereto.

The literal teaching of figure 1 of Koo, disclosing an IC chip cooled by a microchannel heat exchanger through which fluid is pumped, can perform a method similar to that recited within the first subparagraph of claim 1: using a pump to cause fluid to flow in a heat exchanger. In this case, convective cooling occurs as shown by equation (6) of Koo and related discussion. However, Koo does not teach, hint or suggest that a pressure of the flowing fluid is adjusted to adjust a boiling point temperature of the fluid in the heat exchanger.

Within the Office Action, it is stated,

> Yamaguchi teaches that adjusting the pressure of the refrigerating fluid in the heat exchanger will correspondingly adjust the boiling point temperature of the refrigerant for evaporation cooling, via a relief valve 5.

Yamaguchi relies on the relief valve 5, and exhausting the boiled coolant through the relief valve 5, to adjust the boiling point of the coolant (Yamaguchi, page 4, paragraphs 2 and 3). As such, the cooling system of Yamaguchi exhausts boiled coolant from the system, and therefore the cooling period of the system is limited to the amount of coolant originally placed in the boiling and cooling heat exchanger 4A. Since boiled coolant is exhausted from the system, Yamaguchi does not teach that gas generated from boiling remains sealed within the system, as claimed.

Although Koo does teach a sealed system, it is the teachings of Yamaguchi, which include the use of the relief valve 5, that enable control of the boiling point temperature. Therefore, the inclusion of the relief valve 5 to exhaust the boiled coolant is required in the proposed combination. However, such a combination fails to teach the amended claim limitations. Specifically, subparagraph two of claim 1 is directed to "adjusting a pressure of the flowing fluid to correspondingly adjust a boiling point temperature of the fluid in the at least one heat exchanger, wherein the fluid and gas generated from boiling remain sealed within the cooling system." For at least these reasons, claim 1 is allowable over the teachings of Koo in view of Yamaguchi.

Claim 4 depends from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claim 4 is allowable as being dependent from an allowable base claim.

Claims 2, 27, and 28 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Takahashi. Claims 2, 27 and 28 depend from claim 1, which is allowable

over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 2, 27, and 28 are allowable as being dependent from an allowable base claim.

Claims 3, 14-21, 26, 31, and 32 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Wightman. Claims 3, 14-21, 26, 31, and 32 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 3, 14-21, 26, 31, and 32 are allowable as being dependent from an allowable base claim.

Claims 5-7 and 9-11 are rejected over Koo in view of Yamaguchi and further in view of Tilton. Claims 5-7 and 9-11 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 5-7 and 9-11 are allowable as being dependent from an allowable base claim.

Claim 8 rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Tilton as applied to claim 5, and still further in view of Cowans. Claim 8 depends from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claim 8 is allowable as being dependent from an allowable base claim.

Claims 12 and 13 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Chesser. Claims 12 and 13 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 12 and 13 are allowable as being dependent from an allowable base claim.

Claims 22-25 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Gold. Claims 22-25 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, claims 22-25 are allowable as being dependent from an allowable base claim.

Claims 29 and 30 are rejected over Koo in view of Yamaguchi as applied to claim 1 and further in view of Jiang. Claims 29 and 30 depend from claim 1, which is allowable over Koo in view of Yamaguchi for the reasons presented above. Thus, Claims 29 and 30 are allowable as being dependent from an allowable base claim.

For the reasons given above, the Applicant respectfully submits that the pending claims 1-32 are in a condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, he is encouraged to call the undersigned at (408) 530-9700 so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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